Heartbeat System
Human Interactions

1 Human Interactions

This document describes the interaction between the heartbeat system (HB) applications and the different people interacting with the system. Three categories of people will use different aspects of the heartbeat system:

- Users – people on shift during data collection
- Application developers – DAQ application developers who need to include the heartbeat functionality in their applications.
- Experts – heartbeat system developers and advanced users who experience abnormal conditions during shifts

The heartbeat system is used to monitor the health of applications in the DAQ software.

2 User View

Users interact with the heartbeat system through the heartbeat display. This section outlines the basic ways in which the user interacts with the display. Users have no input to the heartbeat system. They receive information on the state of DAQ applications through entries on the heartbeat display.

Heartbeats expected

The heartbeat display shows the user a list containing the names of standard applications expected to send heartbeats to the heartbeat server. This provides a quick method for determining if all the applications needed are executing.

Heartbeats registered

All applications not on the expected to send heartbeats list are displayed following the expected list.

Heartbeat seen

Display the last time a heartbeat was seen for an application.

Heartbeat lost

Display the time when the system detects that an expected heartbeat was not seen.

Heartbeat found

Display the time when a lost heartbeat is found.

Heartbeat server up

The heartbeat server has a heartbeat.

Heartbeat server down

The heartbeat server has a problem.

3 Application Developer View

Application developers include the relevant parts of the HB API in their application code. The highest-level actions that a developer would need in their application are outlined here.

3.1 Client

Configure ITC

Set identity information for ITC statistics.

Instantiate client

Create a client object.

Connect

Create a connection between a client application and the server.

Disconnect

Close a connection between a client application and the server.

Reconnect

After a previous connection has been severed reestablish a connection to the server. This must be handled for the client or server breaking the connection.

3.2 HB Sender client

Add sender

Inform the HB server that the application will be sending heartbeats.

Delete sender

Inform the HB server that the application will stop sending heartbeats.

Expiration period

Specify how long the server should miss a heartbeat before the heartbeat is lost.

Expiration alarm

Specify the alarm to be signaled by the server if the heartbeat is lost.

Start beating

Tells the HB server that the HB sender client has finished sending setup information and will begin sending heartbeat tics.

Heartbeat tic

Periodically send a tic message to let the heartbeat server know that the application is alive. The application developer sends a tic periodically such that sending tics doesn't interfere with an applications execution yet provides timely notification when a problem arises.

3.3 Receiver Client

Add sender

Inform the HB server that the application wants to receive heartbeat information.

Delete sender

Inform the HB server that the application no longer wants to receive heartbeat information.

Receive messages

Configure a callback to process the heartbeat messages received from the server.

Store messages

Place heartbeat messages received from the server in an area accessible by other objects. For example, on update the display GUI would access the messages and adjust the display appropriately.

4 Expert View

Experts interact with the heartbeat system through an expert interface. This section outlines the commands that an expert would issue to the heartbeat server from the expert interface and commands that influence the expert interface behavior.

4.1 Expert Interface Commands

Help

Generate a list of commands available to the expert.

Verbose

Make all report display extra information of various complexity.

Connect

Make a connection with the server.

Disconnect

Close the connection with the server.

Reconnect

Connect to the server using parameters from the last connection. Useful if the server crashes.

Exit

Exit expert program.

4.2 Server Commands

Connections

Get a list of all connections o the server.

One connection
Get information on one connection to the server.

ITC connections
Get ITC information on all connections to the server.

ITC one connection
Get ITC information on one connection to the server.

Report
Display server statistics.

Periodic report
Periodically display server statistics.

Priority report
Display server statistics by using a mechanism that bypasses the message queue.

Priority ping
Ping the server. Bypass the message queue.

Ping
Ping the server. Process the request in the message queue.

Close log
Close the server log file.

Abort connection
Forcibly close a client connection.

Shutdown
Shutdown the server.

Abort
Abort the server.

Activate
Receive and process incoming messages.

Inactive
Receive incoming messages but don’t process them.